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ABSTRACT

Writing teachers have a potential role in the development of a better hypertext. Hypertext can be defined as writing designed to be read--and perhaps added to--along many different paths, at the reader's choice. What the computer does for hypertext is increase greatly the speed and potential number of the links between chapters or ideas. What writing specialists can do to help in the creation of hypertexts is (1) become familiar with the medium, since hypertext is a future of written communication; (2) insist on even greater sophistication and ease of use for hypertext; and (3) bring the knowledge of writing instruction to the solution of the problems inherent in hypertext. Discussions that are going on now about hypertext include research exploring readability variables, the "node size" (the quantity of information that makes up the basic unit of a hypertext document), and the debate about the links that lead from one hypertext to another. Discussions are also in progress among hypertext developers about the extent and nature of reader participation in the hypertext writing process. The founders of the hypertext concept have insisted that hypertext should remove the distinction between writer and reader, and so they have designed hypertext systems that permit the reader to annotate or even alter the hypertext document, while still preserving the integrity of the earlier writer's work. Writing specialists can help find the answers to what kind of reader activity should be provided for. (MS)

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Hypertext: A New Medium for Reading and Writing

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CCCC, March 1989

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In late 1967 or early 1968, I heard a lecture at Union Theological Seminary by a young Bell Labs theorist named Ted Nelson. The subject: a new medium for communication, something he called "hypertext." After the lecture, I walked back across Broadway to my graduate student room at Columbia and began outlining a hypertext book. Now, twenty years later, I at last have the technology to write it.

After twenty years in the making (perhaps over forty, depending on where you start your count), hypertext has become an overnight success. Within the last two to three years, hypertext has ceased to be a minor cult interest and has become perhaps the most talked-about concept in all of computerdom, in fact in the field of information handling in general. When I signed onto Dialog last week to check recent references for this paper, I was able to download over 50 single-spaced pages of titles of articles on hypertext, from just a few of Dialog's databases. And here we are at CCCC, of all places, with not one but two sessions on the subject.

What I propose to do for the next few minutes is present what is in fact the first half of a two-part presentation, the second part of which will be given in May at the Conference on Computers and Writing in Minneapolis. That

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second half will discuss the potential role of hypertext in the teaching of writing. This first half, which I am confident will stand alone, will discuss the reverse of that: the potential role of us writing teachers in the development of better hypertext.

Because some of you may be new to the concept of hypertext, I feel obliged, as the first speaker at this session, to begin by defining our topic. Hypertext has been variously defined as "nonlinear" or "nonsequential" or "multidimensional" writing, but a more detailed definition might be "writing designed to be read--and perhaps added to--along many different paths, at the reader's choice."

Among printed materials, the first book approaching hypertext status was perhaps the Talmud, with its layers of law, commentary, and commentary on commentary, all linked together. Most reference books have hypertextual qualities: the Variorum Shakespeare, for example, with its elaborate footnote links, can be thought of as a kind of hypertext, as can the Britannica 3, with its extensive cross-referencing and its multiple means of access. The most hypertextual of novels is surely Finnegans Wake.

"Programmed" textbooks are another form of printed hypertext: students choose answers to multiple-choice questions and are directed--linked--to different pages depending on their choice. Similarly structured are the popular children's books (and a few for adults as well) in which readers, playing the role of the main character, make choices that lead or link them into different story lines. Each chapter of Julio Cortazar's novel Hopscotch

ends with a choice for the reader, who is then directed, or linked, to one of two possible following chapters.

What the computer does for hypertext is increase greatly the speed and potential number of the links. But the difference between printed and computerized hypertext is more than quantitative. A good computer-based hypertext is a qualitatively different communications medium; it gives its reader the feel of moving effortlessly through a transparent information environment, like a fish in a sea of knowledge.

While versions of hypertext have existed on mainframe computers for two decades, only in the last two years have hypertext systems become available for microcomputers. Best known is Apple's HyperCard, packaged with Macintosh computers, but as Richard Tracey will discuss in a few minutes, a number of hypertext programs exist for IBM-compatible machines as well.

In education, business, and government, hypertext applications are flourishing. The Environmental Protection Agency, for example, is using the hypertext program Guide for its "Reg-in-a-Box" hypertext on underground gasoline storage, and Ford is in the process of installing a Guide-based hypertext system in its automotive service departments.

Although examples of hypertext can't, by definition, be included in a piece of linear communication like this presentation, it may be possible to give you some of the "feel" of hypertext use. Imagine yourself a department manager at an insurance company, going through your morning's electronic mail

on your computer screen. One memo, from your vice president, concerns a bill, introduced in your state legislature, that may affect your department. The vice president asks you to study the bill and its implications, and so she has linked her memo to an ever-growing company hypertext on insurance law.

You want to begin by looking at the current bill itself, so you move the cursor on your screen to the name of the bill in the vice president's memo, and you click the button on your mouse. The memo disappears and is replaced by a summary of the bill. As you read the summary, you realize that its third sentence is the potentially important one for you, so you move your cursor to that sentence and click again. The sentence is instantly replaced by the actual text of that section of the bill.

As you read the section, a word troubles you, so you click on the word. A "window" opens on the right side of your screen, with the word's legal definition. You click again, return to the text, and continue reading. An asterisk signals a hidden comment, and you click on the asterisk to make the comment visible. It's a note from your corporate attorney, suggesting a precedent in another state's regulations; you click on his note, and see the regulation he mentions. And so on.

As I hope this narrative has suggested, a good hypertext has the appearance of a wonderfully flexible and effortless database, giving instant access to virtually unlimited information. Indeed, that's the goal of Ted Nelson, whose "Xanadu" project envisions a single global hypertext, linking all recorded knowledge.

But such effortlessness and flexibility does not come automatically: hypertexts have to be written. That's where we, as writing specialists, come in. Let me suggest three roles we should begin playing.

First, we should simply become familiar with the medium, for if hypertext is not the future for written communication, it is undeniably a future. Even those of us not actively writing hypertext should have read some hypertext and should be able to discuss it knowledgeably. I'll be giving you a bibliography that suggests inexpensive hypertexts to read, as well as some introductory print resources.

Second, we should insist on ever greater sophistication and ease of use for hypertext. Hypertext today is largely where word processing was five to ten years ago, when it consisted only of clumsy, opaque, line editors designed to help write program code. Just as working writers had to demand (and help write specifications for) full-screen, flexible, transparent word processing systems, so working writers will need to press for (and help design) flexible, transparent hypertext programs.

Third, we should bring our unique knowledge to the solution of the problems inherent in hypertext. As Jeff Conklin points out, hypertext carries two large difficulties for its writers and readers: disorientation and cognitive overload. The first problem is getting "lost in space," not knowing where one is in the document or how to get where one wants to go; the second problem is becoming overwhelmed by the amount of information available. As

writing specialists, we can help solve these problems by bringing our theoretical knowledge of such fields as discourse analysis, text linguistics, and the psychology of reading, as well as our practical knowledge of how to lead readers through a piece of writing.

Let me suggest some examples of discussions already going on in the hypertext community--discussions to which we as writing specialists ought to be making valuable contributions.

Those discussions begin at the most basic level of text--and perhaps graphics--on a screen. Since hypertext must be read from a computer screen, a whole range of design considerations arise. Some studies, for example, show that reading text on a computer screen is 30 to 50 percent slower than reading typewritten text. Other research is exploring such readability variables as single or double spacing, heading size and position, line length, and scrolling conventions. (PC-Hypertext, for example, totally replaces the screen as you scroll down; unlike many word processors, the program doesn't repeat the last line or two of a screen at the top of the next screen. I, personally, find that omission somewhat disorienting.) I suggest that we, as writing specialists, have something to contribute to such research. At the least, we can surely broaden questions of screen design so that they take into account the holistic nature of reading.

A second discussion in the hypertext community is about "node size," the quantity of information that makes up the basic, indivisible unit of a hypertext document. Ted Nelson argues that for some purposes, especially for

copyright protection of electronic texts, the basic unit is the individual character: an alphabet letter, number, or other symbol. Hypercard, like various other descendants of the Xerox Notecards system, uses the screen-sized "card" as its basic unit, although scrolling of additional text is possible within a card. Guide, on the other hand, looks more like running text, with nodes that can span multiple screens. Other hypertext systems seem biased toward smaller or larger units, and hypertext designers are actively debating optimal node size. These designers, however, needn't reinvent the wheel; they can learn from our struggles at defining paragraphs or stadia of discourse.

Another active debate is about the links that lead from one hypertext node to another. Most hypertext designers agree that links need to be labeled at their starting points, so that readers have an idea what lies at the other end; in his pioneering work Dream Machines, for example, Ted Nelson discusses at length the importance--in normal, linear prose--of such transition words as indeed and but and asserts the importance of these and similar link labels in hypertext. Some designers have begun to suggest that possible link labels might form a finite set. Randall Trigg, for example, in the first Ph.D. dissertation on the subject of hypertext, offers a list of more than 80 standard link types, including "generalization," "specification," "example," "explanation," and "argument." While such discussions as those of Nelson and Trigg are to be applauded, they could surely be enriched by the work already done, for example, by Halliday and Hassan.

Another discussion in the hypertext community concerns solutions for the problem of disorientation I mentioned a few minutes ago. When we read linear text, however lost we might get in its subject matter, we have the constant security of seeing that we are, for example, on page 257, about two-thirds of the way through the book, and we can quickly determine that four pages later, on page 261, this chapter will end. Yet even with this kind of physical orienting, we still rely on a multitude of textual devices--focus chains, advance organizers, enumerative words, and the like--to keep us oriented in our reading. In a hypertext document, the need for such devices is magnified greatly, requiring what one hypertext researcher calls "bookmarks" and "compasses" much more frequently in the work. Again, I suggest that we writing specialists have special contributions to make to that effort.

One increasingly common solution to the problem of disorientation in hypertext is the representation of hypertext networks as if they were hierarchies. Even though a hypertext, seen "from above," might resemble a frighteningly complex spider web, with thousands of nodes interconnected with tens of thousands of links, to an individual reader it can be made to look--on the computer screen--like a simple hierarchy, in which one can move from the parent node where one stands to any of a number of children nodes. Steven Feiner, at Columbia, argues for the importance of representing hypertext in this way, finding that hierarchies are much simpler than complex networks to orient and navigate within. Neil Larson has built this principle into his PC-Hypertext--based on his outline processor Houdini; as you move through a PC-Hypertext network, the system constructs a personal hierarchy just for you, simultaneously "unwinding a ball of string" so that you can always find your

way out along the very same path you followed to come in. Of course, writers all along have struggled with the problem of representing nonlinear information in a linear form, and writing specialists have struggled with models and explanations of how that can be done. We can bring what we have learned to the same problem in hypertext: the representation of non-linear information as if it were linear.

A side note: Neil Larson, in an otherwise wonderfully sound discussion of hypertext writing, asserts that five is the optimal number of choices to give a reader at any point. It may be; I don't know. One choice is surely too few, and twenty is probably too many. I affectionately suggest that Mr. Larson doesn't know either. But together, perhaps we can find out--or at least find out how to begin to determine that number for a given reader at a given point in a document.

Finally, for now, discussions are in progress among hypertext developers about the extent and nature of reader participation in the hypertext writing process. Some hypertexts are clearly "read-only," and for certain purposes that may suffice. But from the beginning of the hypertext concept, Nelson and others have insisted that hypertext should remove the distinction between writer and reader, and so they have designed hypertext systems that permit the reader to annotate or even alter the hypertext document, while still preserving the integrity of the earlier writer's work. But what kind of reader activity should be provided for? I suggest that with our long-standing interest in reading as an active, participatory process, we can help find answers.

In short, I suggest that we, as writing specialists, are living at a very special time--a time when we can be witnesses to the birth of a wholly new writing medium. I would add only that we should not just be witnesses, but also be midwives at that birth. We should get involved with the birth of hypertext, to ease the labor and to help make the baby as healthy as possible.